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RESEARCH AID

ESTIMATED FLOORSPACE OF KIEV AIRFRAME PLANT NO. 473

CIA/RR RA-37
11 August 1958

CENTRAL INTELLIGENCE AGENCY

OFFICE OF RESEARCH AND REPORTS

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FOREWORD

This research aid, one of a series evaluating current floorspace of Soviet airframe plants of the Ministry of the Aviation Industry (Ministerstvo Aviatsionnoy Promyshlennosti -- MAP), is based primarily on metrical analysis* of World War II German photography. Supplementary intelligence data also have been used in an attempt to ascertain the composition and functions of the individual plant buildings.

* Determination of measurements by the use of aerial photographs.

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(ORR Project 33.1747)

ESTIMATED FLOORSPACE OF KIEV AIRFRAME PLANT NO. 473*

Summary

Kiev Airframe Plant No. 473 in the USSR is estimated to contain a minimum total of 890,000 square feet (sq ft) of floorspace.** The plant has a final assembly area of approximately 210,000 sq ft, or about 24 percent*** of the total floorspace. The administration area of the plant is believed to comprise a minimum of 240,000 sq ft, or about 26 percent of the total floorspace. The multistory area of the plant is estimated at 130,000 sq ft, or 15 percent of the total floorspace. Within the plant, there is a minimum of 30,000 sq ft of warehouse**** area, or 3 percent of the total floorspace. There are no known basement areas within the plant. Covering an over-all area of about 3 million sq ft and having a total roof area of about 760,000 sq ft, the plant has a building density† of about 25 percent.

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* Based on aerial photography. (See Figure 1, following p. 2.) 1/ (For serially numbered source references, see Appendix D.) The estimates and conclusions contained in this research aid represent the best judgment of ORR as of 15 June 1958.

** All figures dealing with square footage are rounded to two significant digits.

*** All percentages are computed from the unrounded data.

**** The term warehouse is applied to those buildings or areas within the plant which have the primary functions of receiving materials from external sources and of holding these materials in bulk quantities for subsequent distribution to the processing points in the plant.

The term storage areas is applied to those buildings or areas, usually parts of buildings which have primary functions other than storage, in which materials are stored or maintained for the direct support of production or service activities. These areas normally are located adjacent to the activities which they support, and they receive their stores from plant warehouses.

† The term building density represents the proportion of the total roof area of an airframe plant to the total plant site expressed as a percentage.

1. Location.

Kiev Airframe Plant No. 473 (50°27' N - 37°24' E) is located in the USSR on the western edge of Kiev, approximately 5 nautical miles west of the Dnepr River. 2/ The plant is situated immediately northwest of the intersection of the Kiev-Zhitomir highway and the Kiev-Korosten' rail line. The intersection is marked by a railroad underpass.

2. History.

Kiev Airframe Plant No. 473 reportedly was constructed in 1918 and possibly was utilized as an aircraft plant from the beginning. 3/ In 1941, as the German Wehrmacht approached, the machinery of the plant was dismantled and evacuated to Novosibirsk. During World War II the plant suffered extensive damage, with estimates ranging from 70 percent to complete destruction.

Reconstruction of Kiev Airframe Plant No. 473 began in 1944 or 1945. In 1945, construction materials and machinery were shipped to the site of Airframe Plant No. 473 from the dismantled German Arado Airframe Plant. Installation of this machinery was very slow, with a large part of the machinery remaining in the open for extended periods. The labor force employed in both reconstruction and machine installation was composed primarily of German prisoners of war.

Since 1951, Kiev Airframe Plant No. 473 probably has contained the experimental design bureau (Opytnoye Konstruktorskoye Byuro -- OKB) of Oleg K. Antonov, Soviet transport designer. 4/

3. Description.

Kiev Airframe Plant No. 473 is roughly rectangular in shape and covers an area of approximately 3 million sq ft. The main axis of the plant extends north to south. Analysis of World War II German photography indicates a total roof area of approximately 310,000 sq ft.* Analysis of available information indicates that as of 1945 the plant had a minimum total of 44,000 sq ft of multistory area. The total floorspace of the plant as of 1945 is estimated to have been slightly less than 360,000 sq ft.

Kiev Airframe Plant No. 473 suffered extensive damage during World War II. Reconstruction of the former existing facility probably was completed by the time the German prisoners of war were repatriated from

* Metrical analysis of Kiev Airframe Plant No. 473 is based on source 5/. Individual building dimensions have been changed according to the best judgment of the analyst.

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Figure 1

USSR: VERTICAL PHOTOGRAPH OF KIEV AIRFRAME PLANT NO. 473

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Kiev in 1948 or 1949, but new construction projects on a large scale have continued through 1957. (See Figure 2.*) At least 6 new buildings, containing slightly more than 530,000 sq ft, have been added to the airframe plant.

The total floorspace of Kiev Airframe Plant No. 473, therefore, currently is estimated to be approximately 890,000 sq ft.** The total roof area is estimated to be approximately 760,000 sq ft, representing a building density of approximately 25 percent. Approximately 30,000 sq ft of warehouse area, or 3 percent of the total floorspace, is contained within the plant. By 1958, Airframe Plant No. 473 contained a minimum total of 130,000 sq ft of multistory area, or 15 percent of the total floorspace.

Approximately 240,000 sq ft of administration area is located within Kiev Airframe Plant No. 473. This area represents about 26 percent of the total floorspace. Although the ratio of administration area to total floorspace is large, such a ratio probably is required for Antonov's OKB.

The major buildings within Kiev Airframe Plant No. 473 reportedly are of steel frame and brick construction with monitor lighting. Less important structures are of load-bearing brick construction. Roof designs on major buildings are primarily of monitor, gable, and flat types. (See Figure 3.*)

Kiev Airframe Plant No. 473 is served by a spur line entering the west side of the plant site from the Kiev-Korosten' rail line. Access to roads is provided by the Kiev-Zhitomir highway.

Svyatoshino Airfield, located immediately adjacent on the north, probably is used as a test and flyaway field for Kiev Airframe Plant No. 473. The Kiev Airfield (also called the Post Volynskiy Airfield) is located approximately 3.5 nautical miles south-southeast of Airframe Plant No. 473.

4. Final Assembly.

Analysis of World War II German photography indicates that before and during World War II the final assembly area of Kiev Airframe Plant No. 473 was contained in 1 shop type of building, 600 feet (ft) long by 350 ft wide. This building, Building No. 46,*** contains approximately

* Following p. 4.
** See Appendix A.
*** Building numbers refer to the designations in Figure 2, following p. 4.

210,000 sq ft, or 24 percent of the total floorspace of Airframe Plant No. 473. The building contains no reported basement area.

It is doubtful that Building No. 46 currently is used as the final assembly area of Kiev Airframe Plant No. 473, as its height, 35 ft, does not appear to provide a high-bay area sufficient for series final assembly of the large Antonov transports. Moreover, the location of the building indicates its utilization for subassembly or as a workshop. It appears probable that one of the newly constructed large structures located on the north side of the plant, probably Building No. 52A, will be used for final assembly when completed.

5. New Construction.*

Since 1944 or 1945, Kiev Airframe Plant No. 473 has undergone a construction program of great proportion. Apparently, many of the buildings built before 1941 and later destroyed during World War II were razed completely and supplanted with new and larger structures. The new building program probably was given impetus by the arrival of Antonov's OKB in 1951. The location of the OKB in the relatively small airframe plant probably necessitated the erection of research and development facilities as well as the expansion of existing administration areas.

Between 1945 and 1954, at least three major buildings were constructed at Kiev Airframe Plant No. 473. This construction includes Buildings Nos. 55, 56, and 57. Buildings Nos. 56 and 57 are administration buildings containing approximately 72,000 and 15,000 sq ft of floorspace, respectively. Building No. 55 is a modern 5-bay workshop, 6/ approximately 350 ft long by 250 ft wide, containing approximately 88,000 sq ft of floorspace.

In mid-1954 a reliable observer reported under construction two new buildings, Buildings Nos. 53 and 54. 7/ Both buildings were described as multistory, conventional buildings. Buildings Nos. 53 and 54 contain 12,000 and 15,000 sq ft of floorspace, respectively. Both buildings are believed to be utilized as shops. Photographs taken by a reliable observer in mid-1955 indicate that these buildings probably were completed by that date. 8/

Sightings at Kiev Airframe Plant No. 473 in 1955 revealed the existence of another large, new building. This structure, Building No. 52,

* For the purposes of this research aid, construction before 1950 is considered to be rehabilitation of World War II facilities. Construction after 1950 is considered to be expansion of World War II facilities and therefore "new construction."

Figure 2

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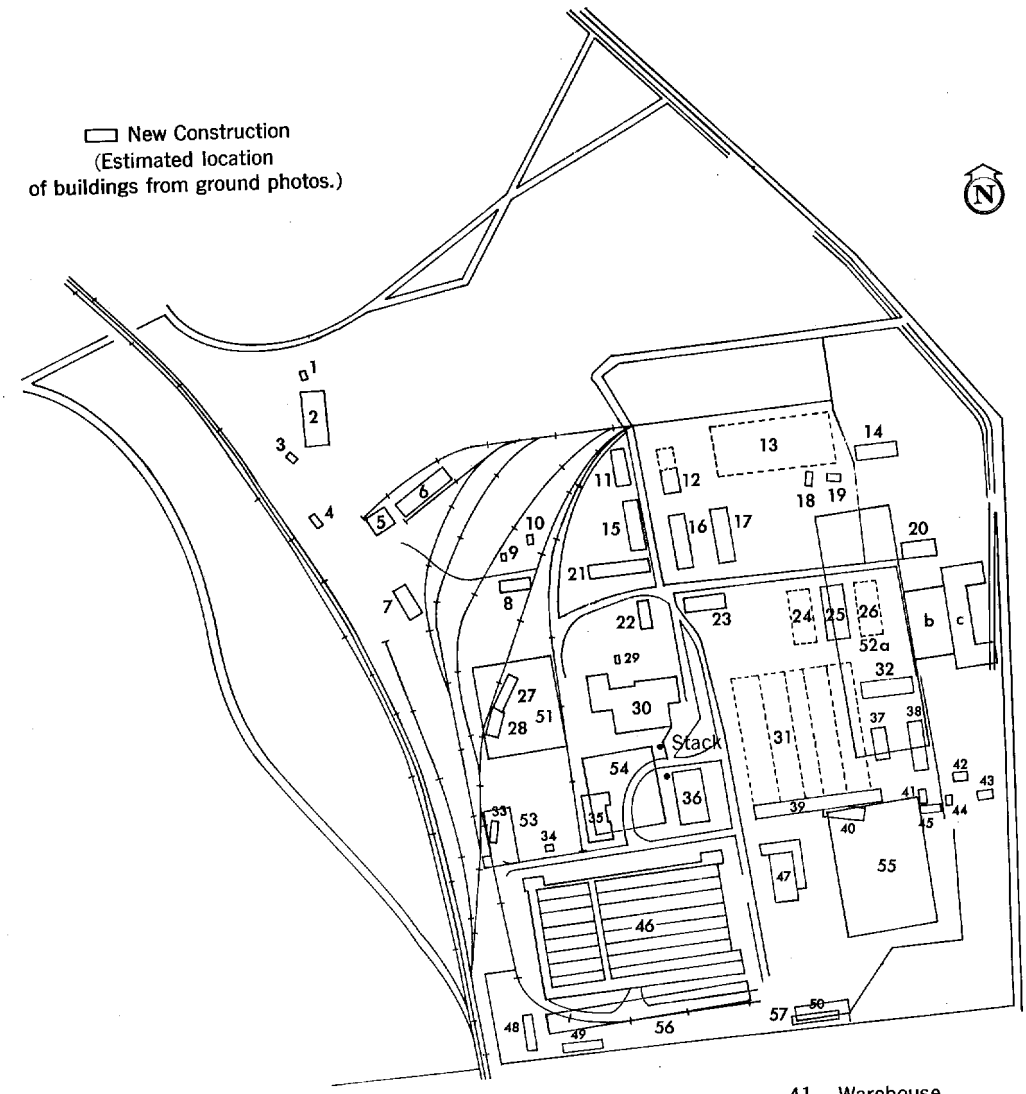
USSR: LAYOUT OF KIEV AIRFRAME PLANT NO. 473



1. Warehouse
2. Administration
3. Warehouse
4. Warehouse
5. Warehouse
6. Warehouse
7. Warehouse
8. Warehouse
9. Warehouse
10. Warehouse
11. Administration
12. Warehouse
13. Shop
14. Warehouse
15. Administration
16. Warehouse
17. Warehouse
18. Warehouse
19. Warehouse
20. Warehouse
21. Warehouse
22. Warehouse
23. Warehouse
24. Warehouse
25. Warehouse
26. Warehouse
27. Warehouse
28. Warehouse
29. Warehouse
30. Administration
31. Shop
32. Warehouse
33. Warehouse
34. Warehouse
35. Shop
36. Shop
37. Warehouse
38. Warehouse
39. Possible Administration
40. Unknown
41. Warehouse
42. Warehouse
43. Warehouse
44. Warehouse
45. Warehouse
46. Shop
47. Shop
48. Probably destroyed
49. Probably destroyed
50. Probably destroyed
51. Shop
52a. Shop
52b. Shop
52c. Shop
53. Shop
54. Shop
55. Shop
56. Administration
57. Administration

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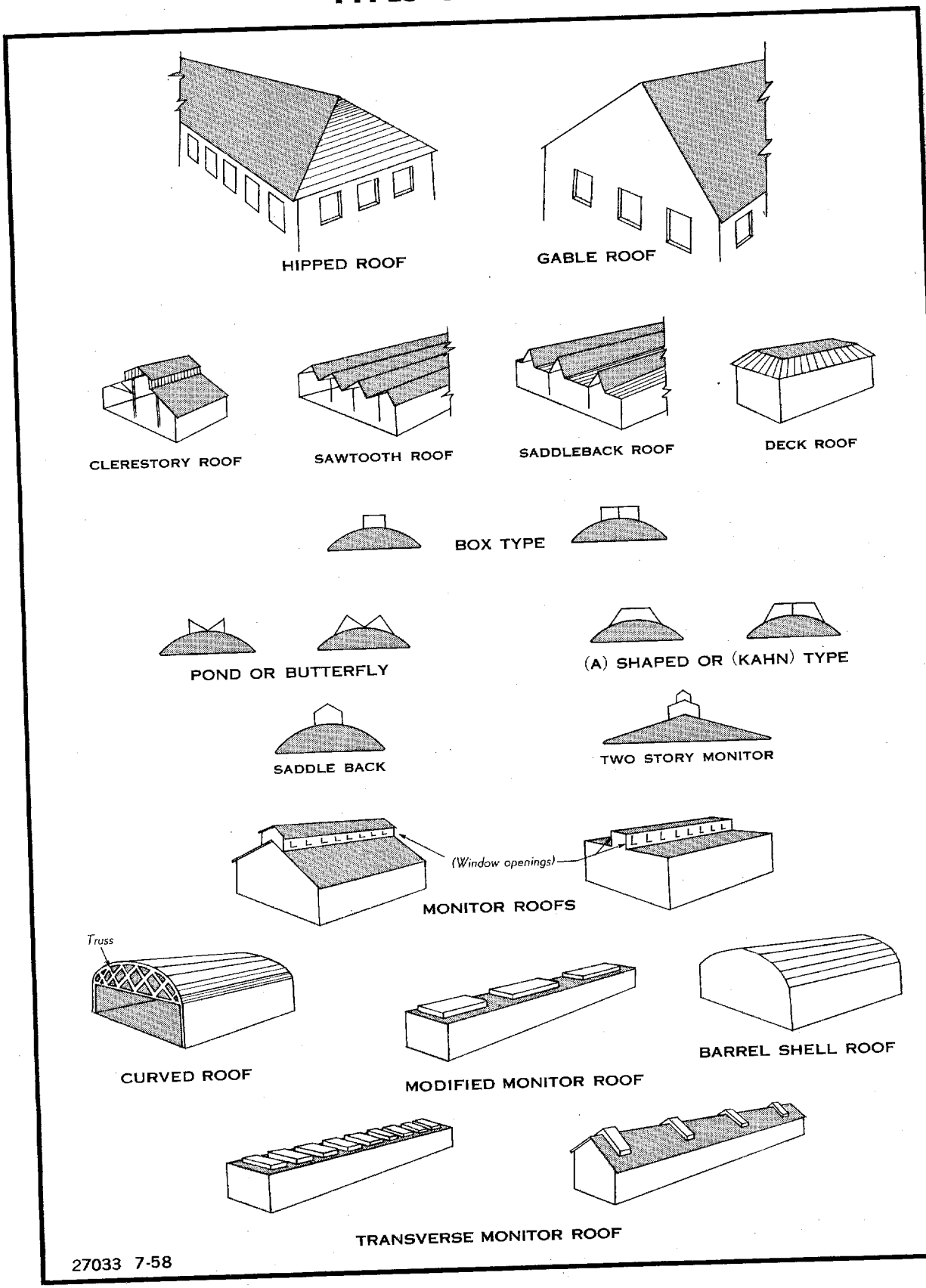
TYPES OF ROOFS

Figure 3



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was described by a reliable observer in October 1955 as a large, new hangar or assembly shed which was 90-percent complete. 9/ Photographs taken by a reliable observer in the spring of 1956 indicated that Building No. 52 had been completed by that time. 10/ The same source also reported under construction another new building of about equal size. This structure, probably Building No. 51, was photographed by a reliable observer during the same month in early 1956. 11/

Sightings in 1957 indicated the existence of another large new building or an extension to Building No. 52. A sighting in 1957 and a subsequent sketch of the plant area by a reliable observer indicate probable expansion of Building No. 52. 12/ If these observations were valid, the building was not completed as previously believed. Building No. 52A reportedly is 800 to 1,000 ft long, 200 to 250 ft wide, and 40 to 50 ft high. Containing approximately 180,000 sq ft of floorspace, it probably is used for final assembly. Building No. 52B is estimated to contain 40,000 sq ft and connects Building No. 52A to the reported 3-story administration type of building, Building No. 53A.

As the expansion of Kiev Airframe Plant No. 473 apparently is still in progress, it is estimated that the plant may be 25 to 30 percent larger than indicated in this research aid, and floorspace totals must be considered a bare minimum.

APPENDIX A

COMPOSITION OF THE FLOORSPACE OF KIEV AIRFRAME PLANT NO. 473 a/*

* Footnotes for Appendix A follow on p. 9.

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APPENDIX B

METHODOLOGY

On the basis of available intelligence an effort was made to determine the location and function of each building in Kiev Airframe Plant No. 473, to identify multistory plant areas, and to account for new construction. All known buildings within the plant site are listed in Appendix A.*

German vertical photographs of 1943 were used to determine the roof area and the physical layout of the plant at that time. Metrical analysis of this photography provided an estimate of the total roof area of the plant. In computation of this total, no allowance could be made for multistory buildings. To compensate for this factor, intelligence information, primarily sightings and photographs by attachés, and, to a much lesser extent, reports of interrogations of prisoners of war were used. Whenever functions of buildings were unknown, the best judgment of the analyst was used to provide an estimate. All estimates of new construction are based on observations by attachés. To obtain the total floorspace, the total roof area was added to the multistory area.

* P. 7, above.

APPENDIX C

GAPS IN INTELLIGENCE

The accuracy of the estimates of the floorspace of Kiev Airframe Plant No. 473 is impaired greatly because of the paucity of information. German vertical photographs of 1943 are available, however, and from the photographs the roof area and the physical layout of the plant as it was in 1943 can be computed. A lack of current vertical photography precludes further study of the plant by this means.

Some information was obtained from interrogation of German prisoner-of-war returnees. Unfortunately, these returnees generally were restricted to the warehouse areas of the plant, and reports of their observations of the remainder of the plant area are vague and incomplete.

Information pertaining to multistory areas within the plant is virtually nonexistent. Because estimates of floorspace in multistory areas greatly affect the estimate of total floorspace, acquisition of this information is of prime importance. The lack of complete oblique ground photography hinders the determination of building heights and designs, and the lack of vertical photography hinders analysis of new construction in the plant. Details of the final assembly area and reliable information concerning the composition of other essential buildings likewise are not available.

APPENDIX D

SOURCE REFERENCES

Evaluations, following the classification entry and designated "Eval.," have the following significance:

Source of Information	Information
Doc. - Documentary	1 - Confirmed by other sources
A - Completely reliable	2 - Probably true
B - Usually reliable	3 - Possibly true
C - Fairly reliable	4 - Doubtful
D - Not usually reliable	5 - Probably false
E - Not reliable	6 - Cannot be judged
F - Cannot be judged	

"Documentary" refers to original documents of foreign governments and organizations; copies or translations of such documents by a staff officer; or information extracted from such documents by a staff officer, all of which may carry the field evaluation "Documentary."

Evaluations not otherwise designated are those appearing on the cited document; those designated "RR" are by the author of this research aid. No "RR" evaluation is given when the author agrees with the evaluation on the cited document.

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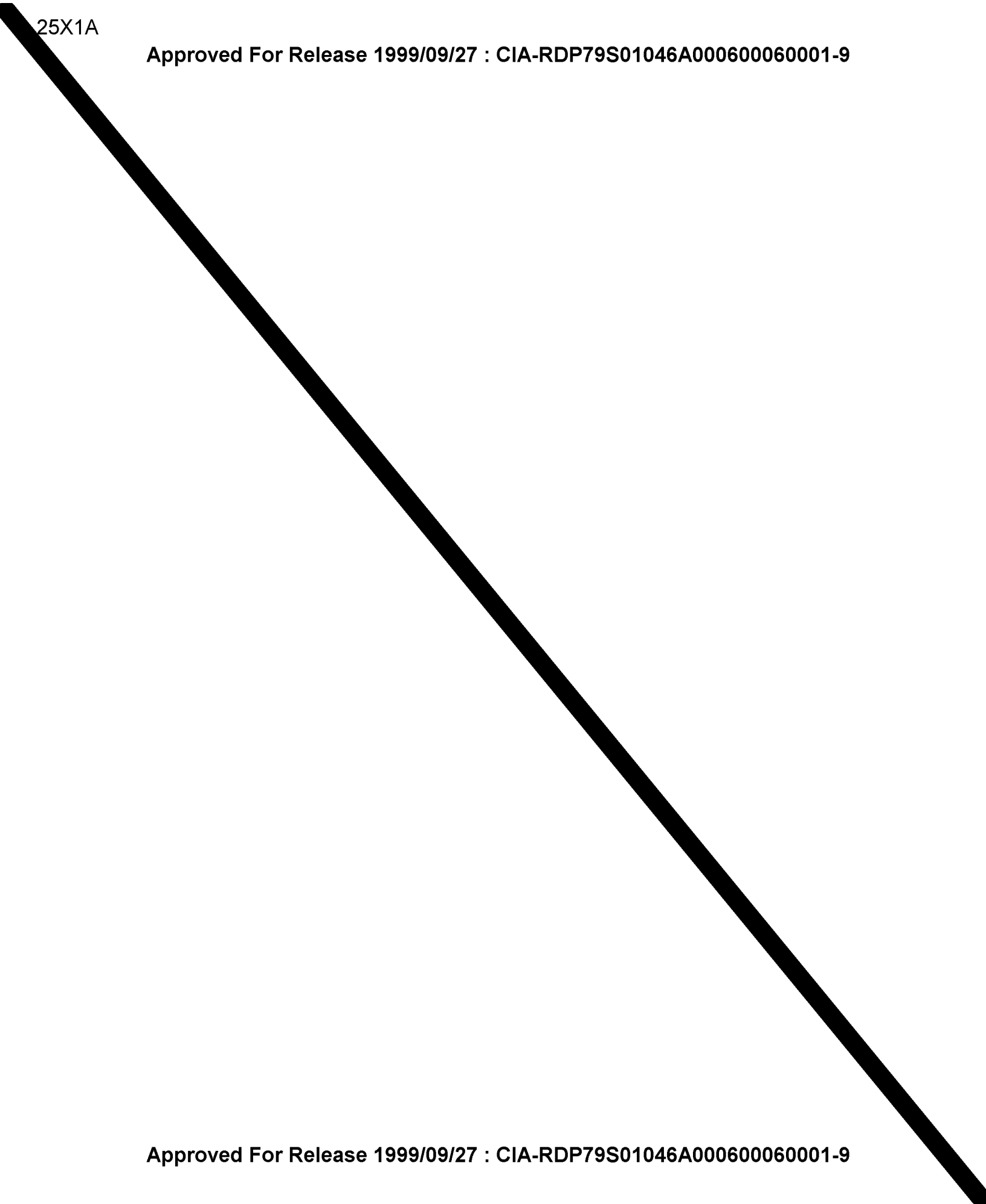

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